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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/566,116

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Akihisa Inoue

OGOSH44USA

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HOWSON AND HOWSON
SUITE 210
501 OFFICE CENTER DRIVE
FT WASHINGTON, PA 19034

EXAMINER

ZHU, WEIPING

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

10/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,116	Applicant(s) INOUE ET AL.	
	Examiner WEIPING ZHU	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,14-25 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 and 21-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,14,20 and 37-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 27, 2008 has been entered.

Status of Claims

2. Claims 2, 3, 14, 20 and 37-40 are currently under examination wherein claim 2 has been amended and claims 37-40 have been newly added in applicant's amendment filed on September 16, 2008. Claims 34-36 have been cancelled in the same amendment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 3, 14, 20, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. ("Deformation Behavior of Zr-Based Bulk Nanocrystalline Amorphous Alloys", Physical Review B, volume 61, number 6, R3761-R3763, February 1, 2000-II) in view of Hu (US 6,096,640).

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With respect to claims 2, 3, 14, 20, 37 and 38, Fan et al. discloses (abstract) a Zr-based bulk nanocrystalline amorphous alloy $\text{Zr}_{53}\text{Ti}_5\text{Ni}_{10}\text{Cu}_{20}\text{Al}_{12}$ having an average grain size range of 2.0-2.5 nm being uniform entirely throughout the specimen (Fan et al., the paragraph bridging the left and right columns and Fig. 2, page R3762), which overlaps the claimed ranges in the instant claim 2, 3, 37 and 38; having a three or more component system and more than 50 at% of Zr as claimed in the instant claims 2 and 37; and having at least one element selected from a group consisting of Cu, Ni and Al as claimed in the instant claims 14, 20 and 37. The Zr-based bulk nanocrystalline amorphous alloy of Fan et al. is a bulk amorphous metallic glass satisfying the requirements of atomic radius difference and negative heat of mixing as claimed in the instant claims 2 and 37.

With respect to claims 2 and 37, Fan et al. does not specify the density of the alloy. However, the alloy of Fan et al. is made by casting the melt of the mixture of pure metals into a copper mould in vacuum (paragraph bridging the left and right columns, page R3761) instead of by powder metallurgy as claimed. It would have been obvious to one of ordinary skill in the art that the density of the alloy of Fan et al. would be very close to the theoretical density of the alloy, which would meet the claimed density limitation.

With respect to claims 2 and 37, Fan et al. does not disclose that the alloy is made by sintering gas-atomized powder as claimed. However, "sintering gas-atomized powder" is a process limitation in a product claim. Even though product claims are limited by and defined by the process, determination of patentability is based on the

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product itself. Fan et al. disclose an amorphous metallic glass (abstract), which reasonably appear to be only slightly different than the claimed amorphous metallic glass in the instant claim 2. A rejection based on section 103 of the status is eminently fair and acceptable. See MPEP 2113.

With respect to claims 2 and 37, Fan et al. does not teach producing a sputtering target from the bulk amorphous metallic glass.

Hu ('640) discloses amorphous materials can be formed into sputtering targets (col. 5, line 60 - col. 6, line 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the bulk metallic glass produced in the process of Fan et al. into a sputtering target as disclosed by Hu ('640) in order to deposit on a substrate a layer of material of desired composition and structure as disclosed by Hu ('640) (col. 5, line 60 - col. 6, line 2).

With respect to claims 2 and 37, Fan et al. in view of Hu ('640) does not specify the diameter of the sputtering target as claimed. However it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the bulk metallic glass produced in the process of Fan et al. in view of Hu ('640) into a sputtering target having the claimed diameter with expected success, because Fan et al. in view of Hu ('640) discloses that the bulk metallic glass ingots having throughout uniform average crystallite size of 2.0-2.5 nm (Fan et al., the paragraph bridging the left and right columns and Fig. 2, page R3762), which reasonably appear to be only slightly different than the bulk metallic glass as claimed in the instant claim 2, can be

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successfully produced by arc melting the mixtures of pure metals in a purified argon atmosphere and casting into a copper mould in vacuum without any limitations on the size and the shape of the bulk metallic glass ingots to be produced (abstract and paragraph bridging the left and right columns, page R3761). Furthermore, it is well settled that merely changing the size of an article is not a matter of invention. See MPEP 2144.04 IV.

4. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. in view of Hu ('640) as applied to claims 2 and 37 above and further in view of Kakiuchi et al. ("Application of Zr-Based Bulk Glassy Alloys to Golf Clubs", Materials Transactions, Vol. 4, No. 4 (2001) pp. 678 to 681).

With respect to claims 39 and 40, Fan et al. in view of Hu ('640) does not disclose the claimed metallic glass. Kakiuchi et al. discloses that Zr-Al-Ni-Cu and Zr-Ti-Al-Ni-Cu metallic glassy alloys have been principle materials for basic research and application studies and that the metallic glassy alloys of $Zr_{60}Al_{10}Ni_{10}Cu_{20}$, which is close to the claimed $Zr_{65}Cu_{17.5}Ni_{10}Al_{7.5}$, and $Zr_{58}Ti_2Al_{10}Ni_{10}Cu_{12}$, which is close to the $Zr_{53}Ti_5Ni_{10}Cu_{20}Al_{12}$ of Fan et al. in view of Hu ('640), have similar properties (sections 1 and 2, pages 678 and 679). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the $Zr_{53}Ti_5Ni_{10}Cu_{20}Al_{12}$ of Fan et al. in view of Hu ('640) with the claimed $Zr_{65}Cu_{17.5}Ni_{10}Al_{7.5}$ to form a sputtering target with an expectation of success, because these metallic glassy alloys are functionally equivalent as disclosed by Kakiuchi et al.. See MPEP 2144.06

Response to Arguments

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5. The applicant's arguments and the 1.132 declaration of Mr. Inoue, the first named inventor, filed on September 16, 2008 have been fully considered but they are not persuasive.

The applicant argues that the ingot of Fan et al. is of a very small size relative to the size of a typical sputtering target; that known technology does not permit one of ordinary skill in the art to simply increase the size of the specimen and maintain its characteristics and uniformity; and that if the size of the specimen of Fan et al. is increased to a sputtering target size having a diameter of 100 mm or more, it would not have an ultrafine or uniform crystal structure as required by the instant claims 2 and 37. In response, see the reasons for the rejections of the claim limitations on the size and uniformity in the instant claims 2 and 37 as stated in the paragraph 3 above. It is also noted that Kakiuchi et al. discloses (section 2, page 678) that a 250 mm x 220 mm x 3 mm flat sheet of Zr-based glassy alloy was produced with satisfactory properties by the clamp forging method mentioned in the declaration as one of the methods currently in use. Furthermore, the method of sintering atomized powders as claimed in the instant claims 2 and 37 is well-known in the art of powder metallurgy.

The declaration under 37 CFR 1.132 filed on September 16, 2008 is insufficient to overcome the rejection of claims 2 and 34-36 based upon 35 U.S.C. 103(a) as being unpatentable over Fan et al. in view of Hu ('640) as set forth in the last Office action because: 1) Fan et al. does not describe the method in details. The method of Fan et al. appears not to be the same as either of the two methods discussed in the declaration. Fan et al. does not limit the size or shape of the ingot as discussed in the paragraph 3

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above; 2) as discussed above, a large sheet was produced by the clamp forging method as disclosed by Kakiuchi et al. (section 2, page 678); and 3) it appears that a target of the claimed size can be produced by the both methods only at much higher costs as discussed in the declaration.

Conclusion

6. This Office action is made non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Roy King/
Supervisory Patent Examiner, Art
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WZ

10/7/2008